



# **Defense Manpower Data Center**

Software Development Life Cycle (SDLC)  
**Develop Software**  
Standard Operating Procedure (SOP)



**Revision History** {enter version history with initial version point at v0.1}

Date	Version	Description	Author
	V0.1	Initial Draft	Don Clary
16 Apr 2019	V1.0	Initial Published Version	SDLC Team

**Review** {reviewer will enter information and remarks here}

Review Date	Reviewed By	Findings	Remarks/Recommendations

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# 1. Overview

Software Development Life Cycle (SDLC) is the process of transforming system/service functional requirements into software applications that fulfill those requirements. The DMDC SDLC provides a structured and repeatable process for delivering updates to existing software applications and developing brand new applications.

This document provides guidance to DMDC software developers on developing a Standard Operating Procedure (SOP) in an accepted, standardized format. A SOP allows a person to quickly execute a task by following a set of easily understood reference procedures that capture how to accomplish the task and provides material that aids in the completion and compliance of the task.

## Purpose

The purpose of the SDLC Develop Software SOP is to provide DMDC software developers with the necessary instructions to carry out the defined SDLC process operations correctly and consistently. This SOP may also be useful to DMDC Product Managers and Project Managers to help them understand this phase in the SDLC process.

## Scope

This SOP covers the SDLC steps needed to take the user stories that articulate the requirements in the approved application Functional Specifications (Func Spec), and turn them into a software release that is ready for deployment to the Model Office region.

### In Scope:

- All sub-steps within SDM-3, Develop Software
- Request to the Request Fulfillment function to set up the developers personal environment
- Request to Release & Deployment Management to deploy the release to the Test region

### Out of Scope:

- Specific activities within the external functions from the Request Fulfillment, Project Management and Release & Deployment Management processes.



### Prerequisites

A DMDC software developer should have all of the following items in place before beginning any step in this SOP:

- DMDC LAN access
- DMDC VDI access if applicable
- DMDC System Administrator (T1) Alternate Token
- Provisioned for access to the code repository

### Affected Departments

Execution of this SOP will result in a software application release that is a candidate for promotion to Service Verification Testing (aka QA). Performing this SOP could impact the following teams outside of Solution Engineering:

- Project Management
- Change Management
- Configuration Management
- Release & Deployment Management

See the DMDC Business Process Library SharePoint site for the latest approved process documents

(<https://dhra.deps.mil/dod/dhrahq/sites/dmdc/bizproc/busproclib/SitePages/Business%20Process%20Library.aspx>)

### Tools

DMDC software development personnel will use the following tools at various stages of performing this SOP:

- DMDC desktop system or Virtual Desktop Infrastructure (VDI)
- Service Request System (Change Gear)
- Change Management System (DMDC CMS application) installed on desktop or VDI (X:\DMDCApps\CMS)
- Source Code Control
  - Tortoise
  - Eclipse Plugin
- Integrated Development Environment
  - Eclipse  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/ss\\_sd/devel/SitePages/Eclipse.aspx](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/SitePages/Eclipse.aspx))
  - Visual Studio Code ([X:\Visual Studio Code](#))
- Build technologies:
  - MAVEN ([X:\Java\apps\maven](#))
  - Npm ([X:\Java\apps\nodejs](#))
- Database Access
  - SQL Developer (Installed on VDI, Software request for desktop)



- Server Access
  - Webtop. User Guide for Privileged Access can be found on SharePoint ([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_port3/DIRP/\\_layouts/15/WopiFrame.aspx?sourcedoc=/dod/dhrahq/sites/DMDC\\_port3/DIRP/Task\\_Order\\_DIRP/Documentation/SOPs\\_HowToDocs/Misc/HowTo\\_F5\\_Privileged\\_User\\_Access.docx&action=default&DefaultItemOpen=1](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_port3/DIRP/_layouts/15/WopiFrame.aspx?sourcedoc=/dod/dhrahq/sites/DMDC_port3/DIRP/Task_Order_DIRP/Documentation/SOPs_HowToDocs/Misc/HowTo_F5_Privileged_User_Access.docx&action=default&DefaultItemOpen=1))
- Unit testing tools
  - JMeter
  - JUnit
- Security Scanning:
  - Fortify– Static Code Analysis
  - Sonatype – Package Scanning
  - On Demand Scan Process
- Application Server
  - WLS 12C ([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/ss\\_sd/devel/Shared%20Documents/JavaDevelopers\\_Setup\\_12c.docx](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/Shared%20Documents/JavaDevelopers_Setup_12c.docx))
  - JBOSS ([X:\Java\jboss](#))
- Communication/Questions
  - Java Developer Group email list
  - Sharepoint discussion board
  - SESUP Jira

Instructions to gain access to a secured tool(s), area or datasets will be included here and directed to the Reference section for further assistance.

### Responsibilities

Function	Activity
SOP Author / Process Owner	Identifies items needed to develop SOP
	Writes the SOP
	Maintains version control
Stakeholder / Process Manager	Review
	Recommends Changes
	Approval, Final Approval
Subject Matter Experts (SME)	Technical expert in process development and implementation
DMDC Developer	Users executing this SOP
DMDC Technical Lead	Escalation POC for developer assistance to resolve issues involving developer tools, setup, configuration issues

Table 1: Responsibilities

Document ID/CI Number: TBD {If applicable, enter the document number and/or associated Configuration Item ID}

Version: 1.00}

Issue Date: 04/16/2019



## 2. Execution

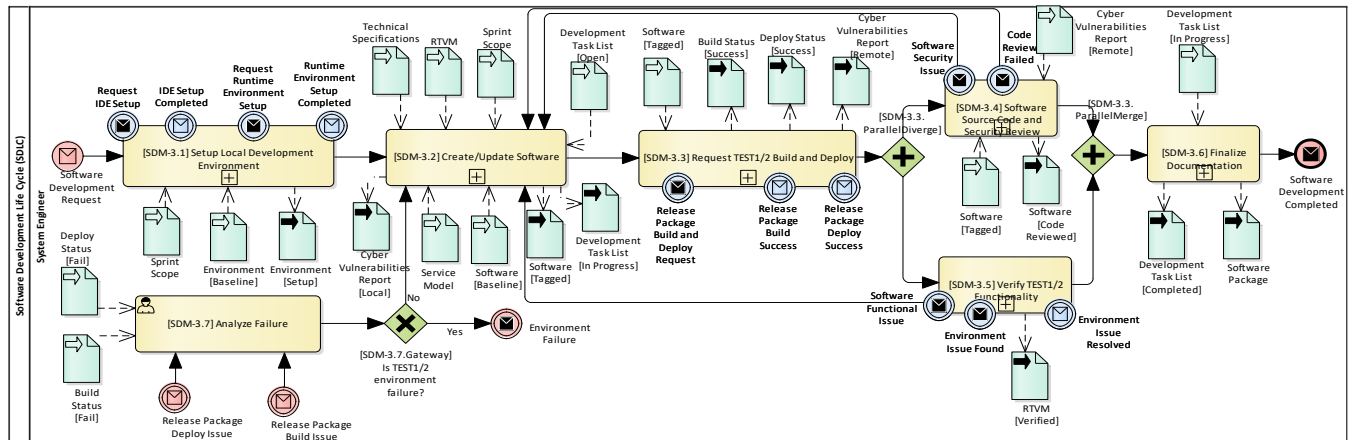


Figure 1: SDLC Develop Software

### 2.1 [SDM-3.1] Setup Local Development Environment (Activity)

If the developer does not have the runtime environment setup to support the software that needs to be created/modified, then the runtime environment is created/setup in this step. This step only needs to be performed for a new developer, when an existing developer receives a new workstation or when the development tools change.

The following should be in place before a developer attempts to begin any of the steps in this section (refer to the [“New Developer Onboarding”](#) instructions):

- DMDC LAN account and access to a desktop workstation or VDI
- Alt token for privileged access  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/servops/AM/DMDCRATS/Shared%20Documents/Alternate%20Token\\_user.doc&action=default&DefaultItemOpen=1](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servops/AM/DMDCRATS/_layouts/15/WopiFrame.aspx?sourcedoc=/dod/dhrahq/sites/DMDC_intserv/servops/AM/DMDCRATS/Shared%20Documents/Alternate%20Token_user.doc&action=default&DefaultItemOpen=1))
- Provisioned access to the DMDC agile development tool  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/ss\\_sd/devel/docs/NewDeveloperOnboarding.docx](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/docs/NewDeveloperOnboarding.docx))
- Access to the DMDC Change Gear Service Request system (<https://help/>)
- Access to the current Hardware Request Form  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/servops/projmgmt/DMDCRO/Design%20Documents/Forms/AllItems.aspx?RootFolder=%2fdod%2fdhrahq%2fsites%2fDMDC%5fintserv%2fservops%2fprojmgmt%2fDMDCRO%2fDesign%20Documents%2fUpdated%20Forms&FolderCTID=0x01200095E54EF0C17D5249917AE18F987E1520](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servops/projmgmt/DMDCRO/Design%20Documents/Forms/AllItems.aspx?RootFolder=%2fdod%2fdhrahq%2fsites%2fDMDC%5fintserv%2fservops%2fprojmgmt%2fDMDCRO%2fDesign%20Documents%2fUpdated%20Forms&FolderCTID=0x01200095E54EF0C17D5249917AE18F987E1520))



- Access to the current Software Request Form  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/servops/projmgmt/DMDCRO/Design%20Documents/Forms/AllItems.aspx?RootFolder=%2fdod%2fdhrahq%2fsites%2fDMDC%5fintserv%2fservops%2fprojmgmt%2fDMDCRO%2fDesign%20Documents%2fUpdated%20Forms&FolderCTID=0x01200095E54EF0C17D5249917AE18F987E1520](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servops/projmgmt/DMDCRO/Design%20Documents/Forms/AllItems.aspx?RootFolder=%2fdod%2fdhrahq%2fsites%2fDMDC%5fintserv%2fservops%2fprojmgmt%2fDMDCRO%2fDesign%20Documents%2fUpdated%20Forms&FolderCTID=0x01200095E54EF0C17D5249917AE18F987E1520))
- 1. Submit a Change Gear Service Request with an attached Hardware Request Form for second hard disk mapped as D: drive. The Hardware Request must be approved by a Service Delivery Division Approval Authority (Division Chiefs, Branch Chiefs, or Team Leads).
- 2. Submit a Change Gear Service Request with an attached Software Request Form listing the applications needed from the Deployable Technology List (DTL)  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/ss\\_sd/entarch/Architecture%20Publications/SPARX%20Exports/DTL\\_sparx\\_export.xlsx?Web=1](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/entarch/Architecture%20Publications/SPARX%20Exports/DTL_sparx_export.xlsx?Web=1))
- 3. Submit a Change Gear Service Request for Provisioned access to the DMDC source code repository  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/servtran/cfm/scm/SitePages/SCM\\_Subversion\\_Request\\_Instructions.aspx](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servtran/cfm/scm/SitePages/SCM_Subversion_Request_Instructions.aspx))
- 4. Once the D: drive has been installed, install the latest Java Development Kit from the X: drive.
- 5. Configure the local app server container according to the instructions provided in the source directory.
- 6. <validation?>

## 2.2[SDM-3.2] Create/Update Software (Activity)

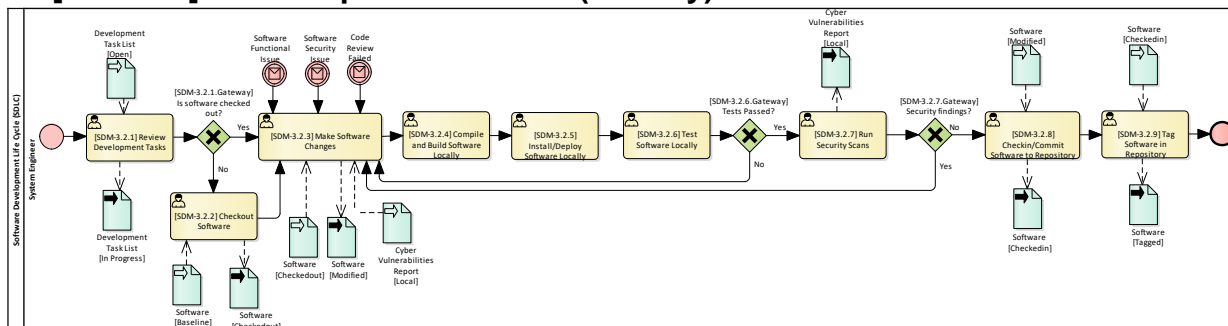


Figure 2: Create/Update Software

1. Request source code access if not already authorized  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/servtran/cfm/scm/SitePages/SCM\\_Subversion\\_Request\\_Instructions.aspx](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servtran/cfm/scm/SitePages/SCM_Subversion_Request_Instructions.aspx)).
2. Check out a personal copy of the source code for the target application.
3. Implement the assigned user stories. Ensure that the code is documented and automated unit tests are added to exercise all aspects of the new code.





Refer to the application's Functional and Technical Specification documents as necessary.

4. Compile, build and perform verification testing of the modified application in the local environment.
5. Use the ad-hoc cyber scan request mechanism to scan the updated code for security vulnerabilities. Address any vulnerabilities and rescan until no new vulnerabilities are present  
([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/ss\\_sd/devel/docs/CyberHardening/Submitting-your-scans-and-receiving-results.docx](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/docs/CyberHardening/Submitting-your-scans-and-receiving-results.docx)).
6. Check-in, tag and commit the updated application source code files to the source repository.

### 2.3 [SDM-3.3] Request TEST1/2 Build and Deploy (Activity)

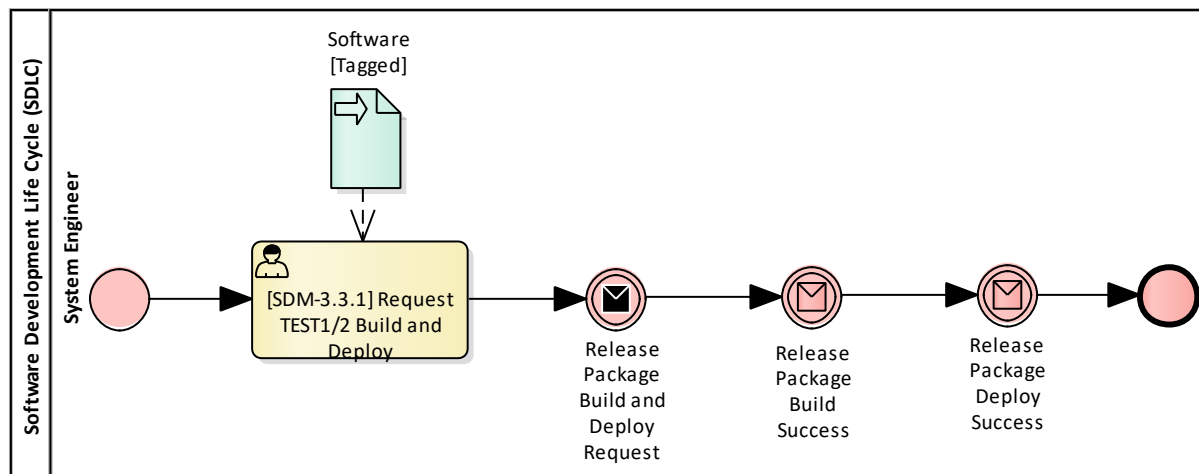


Figure 3: Request TEST1/2 Build and Deploy

The developer is responsible for initiating the request to build and deploy their software to the designated region for developer level testing. Currently in DMDC, these regions are labeled Test 1 and Test 2.

- Test 1 is used for next generation development changes
- Test 2 is used for production simulation changes (resolving issues found in production region)

DMDC currently uses the Change Management System (CMS) GOTS application to manage requests for build and deployment of software artifacts managed within CMS.

CMS is managed and maintained by the Technical Services directorate. Information on CMS is available via the Service Transition team site on DEPS Share Point.

The CMS User Manual can be found on the DMDC CM SharePoint site ([https://dhra.deps.mil/dod/dhrahq/sites/DMDC\\_intserv/servtran/cfm/scm/SCM\\_Documents/SCM\\_Forms/CMS%20User%20Manual.docx](https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servtran/cfm/scm/SCM_Documents/SCM_Forms/CMS%20User%20Manual.docx)). Refer to section



2.3.6.1, Web Build or Move, for step by step instructions for submitting a build request.

## 2.4[SDM-3.4] Software Source Code and Security Review (Activity)

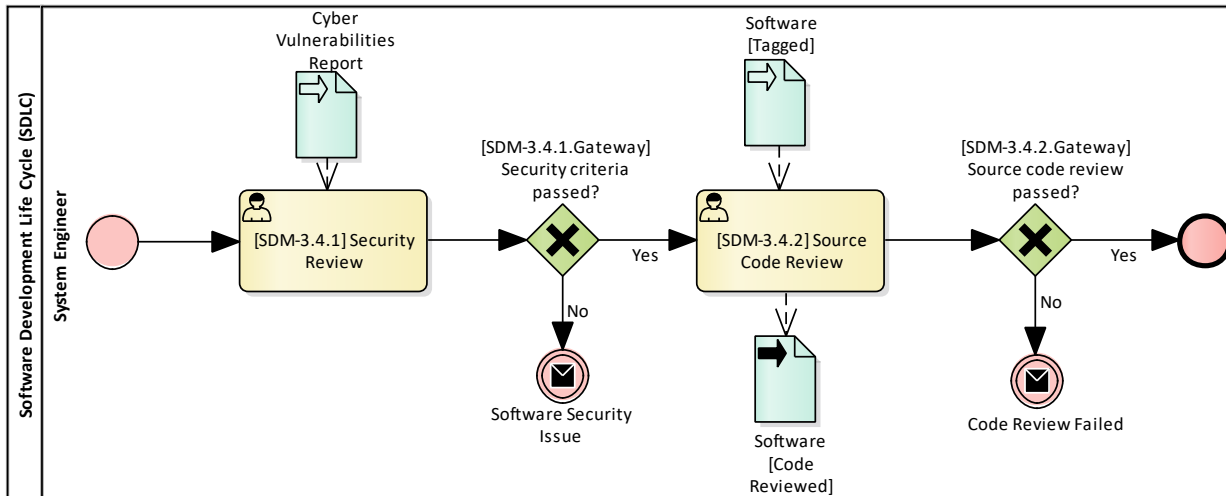


Figure 4: Software Source Code and Security Review

The source code in the release candidate needs to be subjected to a code review and a review of the security vulnerabilities as part of the promotion to the Test regions for integration testing.

DMDC guidelines for conducting code reviews are published on the Developer Resources SharePoint (<insert link>).

DMDC guidelines for completing an application cyber security Plan of Actions and Milestones (POA&M) are published on SharePoint (<insert link>).



## 2.5[SDM-3.5] Verify TEST1/2 Functionality (Activity)

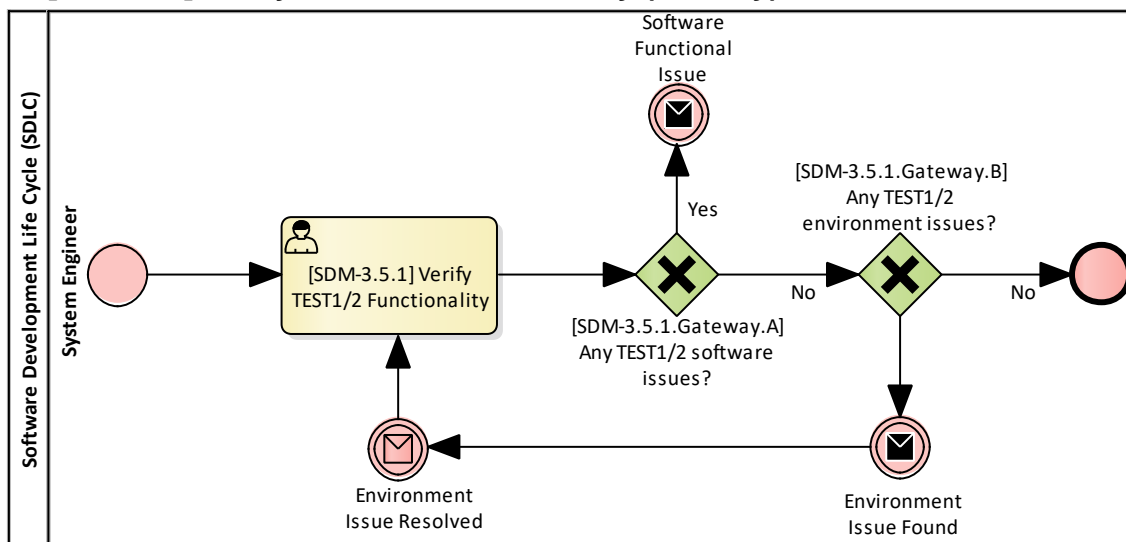


Figure 5: Verify TEST1/2 Functionality

The project development team should have constructed unit tests for all new or modified requirements in the release candidate and documented the test cases in the Requirements Test Verification Matrix (RTVM). A template of the RTVM is available on the Business Process SharePoint site under the SDLC Templates area

([https://dhra.deps.mil/dod/dhrahq/sites/dmdc/bizproc/Business%20Process%20Review/Business%20Process%20Review/Test Case Matrix sample.xls](https://dhra.deps.mil/dod/dhrahq/sites/dmdc/bizproc/Business%20Process%20Review/Business%20Process%20Review/Test%20Case%20Matrix%20sample.xls)).

The project development team should functionally exercise the release candidate to verify that each new/modified test case completes successfully, after the candidate has been successfully deployed to the TEST1/2 region.

## 2.6[SDM-3.6] Finalize Documentation (Activity)

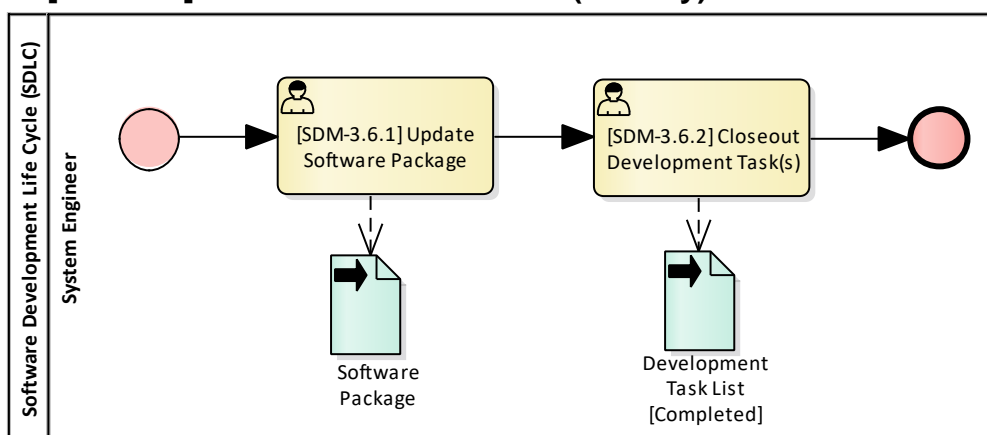


Figure 6: Finalize Documentation



As part of the Finalize Documentation activity, the software development team is responsible for the following sub-tasks, prior to turning the release over to the Product Manager:

- Software checked into the source repository and tagged/versioned
- Updated application Runbook
- Completed Cyber Vulnerability Report (POA&M)
- Updated RTVM
- Updated Functional Specification
- Updated Technical Specification

A runbook is:

- 1) A listing of all dependencies
- 2) The steps required to install, start, stop, and monitor
- 3) General troubleshooting documentation (e.g. common error codes/messages)
- 4) Verification/validation that the product is functioning as designed
- 5) Specific configuration items such as start or stop parameters (e.g. projprops)

### 3. References

Document	Reference
SDLC Process Handbook	<a href="https://dhra.deps.mil/dod/dhrahq/sites/dmdc/bizproc/busproclib/SitePages/Business%20Process%20Library.aspx">https://dhra.deps.mil/dod/dhrahq/sites/dmdc/bizproc/busproclib/SitePages/Business%20Process%20Library.aspx</a>
Eclipse Installation Instructions	<a href="https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/SitePages/Eclipse.aspx">https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/SitePages/Eclipse.aspx</a>
Developer Onboarding Instructions	<a href="https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/docs/New%20Developer%20Onboarding.docx">https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/docs/New%20Developer%20Onboarding.docx</a>
User Guide for Privileged Access	<a href="https://dhra.deps.mil/dod/dhrahq/sites/DMDC_port3/DIRP/_layouts/15/WopiFrame.aspx?sourcedoc=/dod/dhrahq/sites/DMDC_port3/DIRP/Task_Order_DIRP/Documentation/SOPs_HowToDocs/Misc/HowTo_F5_Privileged_User_Access.docx&amp;action=default&amp;DefaultItemOpen=1">https://dhra.deps.mil/dod/dhrahq/sites/DMDC_port3/DIRP/_layouts/15/WopiFrame.aspx?sourcedoc=/dod/dhrahq/sites/DMDC_port3/DIRP/Task_Order_DIRP/Documentation/SOPs_HowToDocs/Misc/HowTo_F5_Privileged_User_Access.docx&amp;action=default&amp;DefaultItemOpen=1</a>
Code Repository Access Request Instructions	<a href="https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servtran/cfm/scm/SitePages/SCM_Subversion_Request_Instructions.aspx">https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servtran/cfm/scm/SitePages/SCM_Subversion_Request_Instructions.aspx</a>
Ad Hoc Cyber Scan Instructions	<a href="https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/docs/CyberHardening/Submitting-your-scans-and-receiving-results.docx">https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ss_sd/devel/docs/CyberHardening/Submitting-your-scans-and-receiving-results.docx</a>
Subversion (access) Request Instructions	<a href="https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servtran/cfm/scm/SitePages/SCM_Subversion_Request_Instructions.aspx">https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/servtran/cfm/scm/SitePages/SCM_Subversion_Request_Instructions.aspx</a>



Document	Reference
DMDC Change Management System (CMS) User Guide	<a href="https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ser/stran/cfm/scm/SCM_Documents/SCM_Forms/CMS%20User%20Manual.docx">https://dhra.deps.mil/dod/dhrahq/sites/DMDC_intserv/ser/stran/cfm/scm/SCM_Documents/SCM_Forms/CMS%20User%20Manual.docx</a>
DMDC Code Review Instructions	<insert link>
DMDC Application POA&M Instructions	<insert link>

## 4. Appendices

An appendix is the section of a SOP used to reference additional information or supplement information provided in the main sections of the document. Appendices should be accessible via the contents section and will generally appear as:

### Appendix A: Glossary

Term	Acronym	Definition	Source
High Level Requirements	HLR	<p>High Level Requirements are business or functional specifications of the capabilities that are required to be present in a product or service provided to DMDC customers. HLRs are gathered by the DMDC Customer Relationship Management (CRM) Directorate during the Requirements Management process. HLRs shall include a clear description of project objectives, scope, project duration, use cases, user roles, required resources, and deliverables/outputs.</p> <p>In general, requirements must be unambiguous (measurable and testable), traceable, complete, consistent, and acceptable to key stakeholders. Resulting artifacts shall involve the sponsors, customers, and other stakeholders (e.g. DHRA) establishing a shared understanding of desired outcomes (success criteria) and value proposition.</p> <p>Documented using Business or Functional Specification Template.</p>	Project Management/Requirements Management Handbooks



Detailed Requirements	-	<p>Detailed requirements refer to the system/technical specifications of the product or service provided to DMDC customers. Detailed requirements shall include business rules which must be followed, component diagrams, application programming interfaces (APIs), and sequence diagrams. Detailed requirements are the result of further elaboration by DMDC business analysts upon High Level Requirements (HLR) produced by the CRM Directorate.</p> <p>In general, requirements must be unambiguous (measurable and testable), traceable, complete, consistent, and acceptable to key stakeholders. Involving the sponsors, customers, and other stakeholders (e.g. DHRA) can create a shared understanding of success criteria, reduce overhead of involvement, and improve deliverable/service acceptance.</p> <p>Documented using System or Technical Specification Template</p>	Project Management/Requirements Management Handbooks
Operating Instruction	OI	<p><b>Current definition in DMDC Restructure Glossary:</b> Detailed instructions related to execution of specific tasks.</p> <p><b>Proposed new definition:</b> An Operating Instruction (OI) is a formal document approved by a senior-level official within DHRA or DMDC that contains guidance for the execution or the implementation of a new or revised policy, directive, or process within the organizations. As a higher-level document than a Standard Operating Procedure (SOP), an OI does not contain a sufficient level of detail to serve as detailed work instructions at every level. An OI does generally contain a stated purpose, applicability, standard definitions, assigned roles and responsibilities, and reference to any policies or directives granting its issuance authority. For example, DHRA issued an OI on the topic of Organizational Streamlining, signed off by DHRA Director William H. Booth</p>	DHRA Operating Instructions



		on April 21, 2017, which assigns roles and responsibilities for the implementation of actions necessary to gain compliance with DoD Directive 1100.4 "Guidance for Manpower Management."	
Standard Operating Procedures	SOP	<p><b>Current definition in DMDC Restructure Glossary:</b> Procedures used by IT Operations Management.</p> <p><b>Proposed new definition:</b> Standard Operating Procedures (SOP), also known as Statements of Procedure, or Standing Operating Procedures, are a document containing detailed instructions for execution of a specific task, set of tasks, or process within DMDC. For a business process within DMDC, an SOP may serve as a follow-on volume to the approved Process Handbook. The SOP may specifically elaborate upon certain tasks or activities described within the Process Handbook, by providing an additional level of detail, including specific DMDC Branches and Divisions assigned responsibility, specific routing instructions, and reference specific Governance authorities involved in a particular decision. An SOP may be approved by the Process Manager, and has an intended audience which is typically the practitioner/performer of the specific activities. For example, the Project Management process within DMDC has an approved Process Handbook, and an SOP may feature instructions for completion of the Cost Estimating process for project managers within the Project and Product Management Division of the Service Delivery (SD) Directorate.</p>	Project Management/Requirements Management Handbooks



## Appendix B: Acronyms

DoD	Department of Defense
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## Appendix C: Definitions

## Appendix D: Further Information

## Appendix E: Examples